

WHAT IS CLAIMED IS,

1. A magnetic reproducing head having a magnetic gap at a medium-facing surface,
comprising

a pair of magnetic yokes of ferromagnetic material, one of the pair of magnetic yokes having
a magnetic tip at the medium-facing surface and a rear portion recessed from the medium-facing
surface and magnetically coupled to the magnetic tip, the magnetic tip having a first width in a
track width direction at the medium-facing surface, the rear portion having a second width in the
track width direction, and the second width being wider than the first width,

a magnetoresistance effect film recessed from the medium-facing surface, and magnetically
coupled to the pair of magnetic yokes of ferromagnetic material, and

a pair of biasing films recessed from the medium-facing surface, one of the pair of biasing
films comprising a hard magnetic material layer disposed adjacent to the rear portion or an
antiferromagnetic material layer disposed in contact with the rear portion.

2. The magnetic reproducing head of claim 1, wherein each of the pair of magnetic yokes
of ferromagnetic material comprises a front surface parallel to the medium-facing surface and
a rear surface parallel to the medium-facing and front surfaces, and wherein the
magnetoresistance effect film has a film surface parallel to the rear surfaces.

3. The magnetic reproducing head of claim 2, wherein the magnetoresistance effect film
is disposed between the pair of magnetic yokes of ferromagnetic material and recessed from the
medium-facing surface.

4. The magnetic reproducing head of claim 1, wherein the magnetic tip and rear portion
comprise a continuously formed ferromagnetic material body.

5. The magnetic reproducing head of claim 1, wherein the magnetic tip is discrete from the rear portion.

6. The magnetic reproducing head of claim 1, further comprising a pair of electrodes, one of the pair of electrodes being coupled to a lower film surface of the magnetoresistance effect element and another one of the pair of electrodes being coupled to an upper film surface of the magnetoresistance effect element.

7. The magnetic reproducing head of claim 1, wherein the one of the pair of magnetic biasing films comprises the hard magnetic material layer and the hard magnetic material layer is disposed in contact with a side surface of the rear portion of the magnetic yoke.

8. The magnetic reproducing head of claim 7, wherein the side surface of the rear portion is tapered.

9. The magnetic reproducing head of claim 1, wherein each of the pair of magnetic biasing films comprises the antiferromagnetic material layer and the antiferromagnetic material layer is disposed in contact with a lower or an upper surface of the rear portion, the lower surface being a side of the medium-facing surface and the upper surface being remote from the medium-facing surface.

10. A magnetic reproducing apparatus for reproducing magnetic information recorded on a magnetic medium, comprising

a magnetic reproducing head having a magnetic gap at a medium-facing surface, comprising a pair of magnetic yokes of ferromagnetic material, one of the pair of magnetic yokes having a magnetic tip at the medium-facing surface and a rear portion recessed from the medium-facing surface and magnetically coupled to the magnetic tip, the magnetic tip having a first width in a

track width direction at the medium-facing surface, the rear portion having a second width in the track width direction, and the second width being wider than the first width,

a magnetoresistance effect film recessed from the medium-facing surface, and magnetically coupled to the pair of magnetic yokes of ferromagnetic material, and

5 a pair of biasing films recessed from the medium-facing surface, one of the pair of biasing films comprising a hard magnetic material layer disposed adjacent to the rear portion or an antiferromagnetic material layer disposed in contact with the rear portion.

11. A magnetic recording head having a magnetic gap at a medium-facing surface, comprising

10 a pair of magnetic cores of ferromagnetic material, one of the pair of magnetic cores having a magnetic tip at the medium-facing surface and a rear portion recessed from the medium-facing surface and magnetically coupled to the magnetic tip, the magnetic tip having a first width in a track width direction at the medium-facing surface, the rear portion having a second width in the track width direction, and the second width being wider than the first width,

15 a recording coil providing a magnetic recording field due to current flow in the recording coil and recessed from the medium-facing surface, and

a pair of biasing films recessed from the medium-facing surface, one of the pair of biasing films comprising a hard magnetic material layer adjacent to the rear portion or an antiferromagnetic material layer in contact with the rear portion.

20 12. The magnetic recording head of claim 11, further comprising an auxiliary magnetic core, the auxiliary magnetic core being on a rear surface of the rear portion, the rear surface being opposite to a front surface of medium-facing surface side.

13. The magnetic recording head of claim 12, wherein the magnetic recording coil is formed on a surface parallel to the rear surface.

14. The magnetic recording head of claim 11, wherein the magnetic tip and the rear portion comprise a continuously formed ferromagnetic material body.

5 15. The magnetic recording head of claim 11, wherein the magnetic tip is discrete body from the rear portion, and the magnetic tip is magnetically coupled to the rear portion.

16. The magnetic recording head of claim 11, wherein the one of the pair of magnetic biasing films comprises the hard magnetic material layer and the hard magnetic material layer is disposed in contact with side surface of the rear portion.

10 17. The magnetic recording head of claim 15, wherein the side surface of the rear portion is tapered.

18. The magnetic recording head of claim 11, wherein the one of the pair of magnetic biasing films comprises the antiferromagnetic material layer, the antiferromagnetic material layer is disposed in contact with a lower or upper surface of the rear portion, the lower surface is a side of the medium-facing surface, and the upper surface is remote from the medium-facing surface.

15 19. A magnetic recording apparatus for recording magnetic information on a magnetic medium, comprising,

a magnetic recording head having a magnetic gap at a medium-facing surface, comprising
a pair of magnetic cores of ferromagnetic material, one of the pair of magnetic cores having
20 a magnetic tip at the medium-facing surface and a rear portion recessed from the medium-facing surface and magnetically coupled to the magnetic tip, the magnetic tip having a first width in a track width direction at the medium-facing surface, the rear portion having a second width in the track width direction, and the second width being wider than the first width,

a recording coil providing a magnetic recording field due to current flow in the recording coil and recessed from the medium-facing surface, and

a pair of biasing films recessed from the medium-facing surface, one of the pair of biasing films comprising a hard magnetic material layer adjacent to the rear portion or an
5 antiferromagnetic material layer in contact with the rear portion.